

WHAT IS CLAIMED IS:

1. A method for assigning a mobile Internet protocol (IP) in an access node of a mobile communication system having the mobile IP, the method
5 comprising the steps of:

assigning a first mobile IP (Mobile IPv6) address available in the access node upon receiving a request for assignment of the first mobile IP (Mobile IPv6) address from a mobile node;

10 assigning a second mobile IP (Mobile IPv4) address upon receiving a request for assignment of the second mobile IP address (Mobile IPv4) from a mobile node which was assigned the first mobile IP address; and

assigning a fifth mobile IP (Mobile Ipv6) address when a mobile node that was assigned a third mobile IP (Mobile IPv6) address and a fourth mobile IP (Mobile IPv4) address has moved from another access node to the access node.

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2. The method of claim 1, wherein the mobile node defines an access node that is initially assigned a Mobile IP address from the mobile communication system, as a home network.

20 3. The method of claim 1, further comprising the step of transmitting an extension message to the home network of the mobile node when the extension message for a Mobile IPv4 address is received from a mobile node, which has moved from the another access node.

25 4. The method of claim 1, further comprising the step of receiving an extension message for a Mobile IPv4 address from the another access node.

5. The method of claim 1, further comprising the step of, upon receiving a message requesting the second mobile IP (Mobile IPv4) address from
30 the mobile node, extracting an available address from a second mobile IP

(Mobile IPv4) pool and assigning the extracted address to the mobile node as the second mobile IP (Mobile IPv4) address.

6. The method of claim 5, wherein when assigning the second
5 mobile IP (Mobile IPv4) address, the access node drives a timer for withdrawing the second mobile IP (Mobile IPv4) address and assigns the second mobile IP (Mobile IPv4) address to the mobile terminal until expiration of the timer.

7. The method of claim 5, further comprising the step of resetting a
10 timer for withdrawing the second mobile IP (Mobile IPv4) address when an extension request signal for the second mobile IP (Mobile IPv4) address is received from the mobile node, which was assigned the second mobile IP (Mobile IPv4) address from the access node.

15 8. An apparatus for assigning a mobile Internet protocol (IP) in an access node of a mobile communication system having the mobile IP, the apparatus comprising:

means for assigning a first mobile IP (Mobile IPv6) address available in the access node upon receiving a request for assignment of the first mobile IP
20 (Mobile IPv6) address from a mobile node;

means for assigning a second mobile IP (Mobile IPv4) address upon receiving a request for assignment of the second mobile IP address (Mobile IPv4) from a mobile node which was assigned the first mobile IP address; and

means for assigning a fifth mobile IP (Mobile IPv6) address when a
25 mobile node that was assigned a third mobile IP (Mobile IPv6) address and a fourth mobile IP (Mobile IPv4) address has moved from another access node to the access node.

9. The apparatus of claim 8, wherein the mobile node defines an access node that is initially assigned a Mobile IP address from the mobile communication system, as a home network.

5 10. The apparatus of claim 8, further comprising means for transmitting an extension message to the home network of the mobile node when the extension message for a Mobile IPv4 address is received from a mobile node, which has moved from said another access node.

10 11. The apparatus of claim 8, further comprising means for receiving an extension message for a Mobile IPv4 address from the another access node.

12. The apparatus of claim 8, further comprising means for, upon receiving a message requesting the second mobile IP (Mobile IPv4) address from
15 the mobile node, extracting an available address from a second mobile IP (Mobile IPv4) pool and assigning the extracted address to the mobile node as the second mobile IP (Mobile IPv4) address.

13. The apparatus of claim 12, wherein when assigning the second
20 mobile IP (Mobile IPv4) address, the access node drives a timer for withdrawing the second mobile IP (Mobile IPv4) address and assigns the second mobile IP (Mobile IPv4) address to the mobile terminal until expiration of the timer.

14. The apparatus of claim 12, further comprising means for
25 resetting a timer for withdrawing the second mobile IP (Mobile IPv4) address when an extension request signal for the second mobile IP (Mobile IPv4) address is received from the mobile node, which was assigned the second mobile IP (Mobile IPv4) address from the access node.

15. A method for transmitting data between a first mobile communication network and a second mobile communication network in a border router of a mobile communication system utilizing a mobile Internet protocol (IP), the method comprising the steps of:

- 5 receiving a first mobile IP (Mobile IPv6) address and a second mobile IP (Mobile IPv4) address from a mobile node;
- storing the received first mobile IP (Mobile IPv6) address and second mobile IP (Mobile IPv4) address;
- updating a third mobile IP being one of (Mobile IPv6) and (Mobile IPv4)
- 10 address included in a location update message when the location update message is received from the mobile node; and
- transmitting a packet using the stored mobile IP addresses when packet data transmitted from a mobile node belonging to the first mobile communication network to the second mobile communication network is received.

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16. The method of claim 15, wherein the first mobile communication network performs communication using the first mobile IP (Mobile IPv6) address.

- 20 17. The method of claim 15, wherein the second mobile communication network performs communication using the second mobile IP (Mobile IPv4) address.

18. The method of claim 15, further comprising the steps of:
- 25 storing tunneling information in an IP mapping table upon receiving the tunneling information from each mobile node; and
- transmitting packet data by tunneling based on the tunneling information.

19. An apparatus for transmitting data between a first mobile
- 30 communication network and a second mobile communication network in a

border router of a mobile communication system utilizing a mobile Internet protocol (IP), the apparatus comprising:

means for receiving a first mobile IP (Mobile IPv6) address and a second mobile IP (Mobile IPv4) address from a mobile node;

5 means for storing the received first mobile IP (Mobile IPv6) address and second mobile IP (Mobile IPv4) address;

means for updating a third mobile IP being one of (Mobile IPv6) and (Mobile IPv4) address included in a location update message when the location update message is received from the mobile node; and

10 means for transmitting a packet using the stored mobile IP addresses when packet data transmitted from a mobile node belonging to the first mobile communication network to the second mobile communication network is received.

15 20. The apparatus of claim 19, wherein the first mobile communication network performs communication using the first mobile IP (Mobile IPv6) address.

21. The apparatus of claim 19, wherein the second mobile
20 communication network performs communication using the second mobile IP (Mobile IPv4) address.

22. The apparatus of claim 19, further comprising:

means for storing tunneling information in an IP mapping table upon
25 receiving the tunneling information from each mobile node; and

means for transmitting packet data by tunneling based on the tunneling information.

23. A method for transmitting/receiving data between a first mobile
30 communication network and a second mobile communication network in a

mobile node of a mobile communication system utilizing a mobile Internet protocol (IP), the method comprising the steps of:

receiving a first mobile IP (Mobile IPv6) address assigned from the first mobile communication network;

5 receiving a second mobile IP (Mobile IPv4) address assigned by sending a request for the second mobile IP (Mobile IPv4) address to an access node when communication with the second mobile communication network is required;

transmitting the assigned first mobile IP (Mobile IPv6) address and second mobile IP (Mobile IPv4) address to a border router; and

10 receiving and assigning a third mobile IP (Mobile IPv6) address, and transmitting the assigned third mobile IP address to the border router when the mobile node moves to another access node in the first mobile communication network.

15 24. The method of claim 23, further comprising the step of transmitting data to the border router when the mobile node desires to transmit packet data to the second mobile communication network.

25. The method of claim 23, further comprising the steps of:

20 determining whether the mobile node was assigned the third mobile IP (Mobile IPv6) address, when one of the assigned second mobile IP (Mobile IPv4) address and a fourth mobile IP (Mobile IPv4) address is extended; and

generating extension information of the second mobile IP (Mobile IPv4) address if it is determined that the mobile node is not assigned the third mobile IP
25 (Mobile IPv6) address, and generating extension information of the second mobile IP (Mobile IPv4) address, including information on a network from which the mobile node is assigned the first mobile IP (Mobile IPv6) address, information on the second mobile IP (Mobile IPv4) address and information on third mobile IP (Mobile IPv6) address, if it is determined that the mobile node is
30 assigned the third mobile IP (Mobile IPv6) address is assigned.

26. The method of claim 23, further comprising the step of transmitting the third mobile IP (Mobile IPv6) address and one of the first mobile IP (Mobile IPv6) address and the second mobile IP (Mobile IPv4) address to the
5 border router, when the third mobile IP (Mobile IPv6) address is received from the access node.

27. An apparatus for transmitting/receiving data between a first mobile communication network and a second mobile communication network in
10 a mobile node of a mobile communication system utilizing a mobile Internet protocol (IP), the apparatus comprising:

means for receiving a first mobile IP (Mobile IPv6) address assigned from the first mobile communication network;

means for receiving a second mobile IP (Mobile IPv4) address assigned
15 by sending a request for the second mobile IP (Mobile IPv4) address to an access node when communication with the second mobile communication network is required;

means for transmitting the assigned first mobile IP (Mobile IPv6) address and second mobile IP (Mobile IPv4) address to a border router; and

20 means for receiving and assigning a third mobile IP (Mobile IPv6) address and transmitting the assigned third mobile IP address to the border router, when the mobile node moves to another access node in the first mobile communication network.

25 28. The apparatus of claim 27, further comprising means for transmitting data to the border router when the mobile node desires to transmit packet data to the second mobile communication network.

29. The apparatus of claim 27, further comprising:

means for determining whether the mobile node was assigned the third mobile IP (Mobile IPv6) address, when one of the assigned second mobile IP (Mobile IPv4) address and a fourth mobile IP (Mobile IPv4) address is extended;

5 and

means for generating extension information of the second mobile IP (Mobile IPv4) address if it is determined that the mobile node is not assigned the third mobile IP (Mobile IPv6) address, and generating extension information of the second mobile IP (Mobile IPv4) address, including information on a network
10 from which the mobile node is assigned the first mobile IP (Mobile IPv6) address, information on the second mobile IP (Mobile IPv4) address and information on third mobile IP (Mobile IPv6) address, if it is determined that the mobile node is assigned the third mobile IP (Mobile IPv6) address is assigned.

15 30. The apparatus of claim 27, further comprising means for transmitting the third mobile IP (Mobile IPv6) address and one of the first mobile IP (Mobile IPv6) address and the second mobile IP (Mobile IPv4) address to the border router, when the third mobile IP (Mobile IPv6) address is received from the access node.

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